REMR TECHNICAL NOTE EM-PC-1.4

DEVELOPMENT OF HIGH SOLIDS COATINGS

PURPOSE: To provide information concerning a study of high-solids and 100 percent-solids coatings for steel in hydraulic structures.

APPLICATIONS: The data acquired during this investigation can be used, in part, to develop performance specifications for high-solids coatings.

Following the laboratory work, several of the more promising coatings were field applied at locations in the Rock Island District as well as on some US Bureau of Reclamations structures.

BACKGROUND: Recently enacted air pollution regulations put severe restrictions on the amount of solvents that paints can contain. Therefore, in compliance with existing and anticipated regulations, it became necessary to evaluate potential coatings to replace those currently used.

DESCRIPTION: A literature search was conducted to identify potential high-solids and 100 percent-solids coatings. A total of 24 were selected and tested. Currently used high-solvent paints were also tested for comparison. The samples were applied to solvent-cleaned and media-blasted steel panels. Methods of application ranged from polyfoam applicators and bristle brushes to airless and plural-component airless spraying. Both basic coatings system properties (such as pot life) and applied coatings system properties (such as immersion resistance) were tested.

CONCLUSIONS: The results of the investigation were encouraging. Several high-solids coatings that should perform satisfactorily under saltwater immersion conditions were found. In fact, some high-solids coatings outperformed some of the widely used low-solids coatings in the saltwater immersion test. A big advantage of the high-solids and 100 percent-solids coatings systems is that they require short time periods between the application of the final coat of the system and the reintroduction of water to the coated hydraulic structure.

Disadvantages include more complicated mixing procedures and more restrictive application-temperature requirements. Also, most of these high-solids and 100 percent-solids coatings systems require compatible weathering topcoats whenever appearance is important; however, most hydraulic structures are in locations where protection is more important than appearance.

Film thickness was not a significant factor in determining coating performance in the saltwater and freshwater immersion tests or in other accelerated weathering tests. The coating systems recommended for further testing in the

field were ones which did not blister in either of the immersion tests and which the data indicated performed at least as well as the currently used low-solids coating systems under laboratory conditions.

High-solids and 100 percent-solids coatings systems usually have higher material and/or application costs that can be offset by shorter downtime. Life-cycle costs of these systems have not been determined.

REFERENCE: A report entitled "High Solids and 100 Percent-Solids Coatings: A State-of-the-Art Investigation" will be published as part of the REMR Technical Report series.